EP 0 855 860 A2

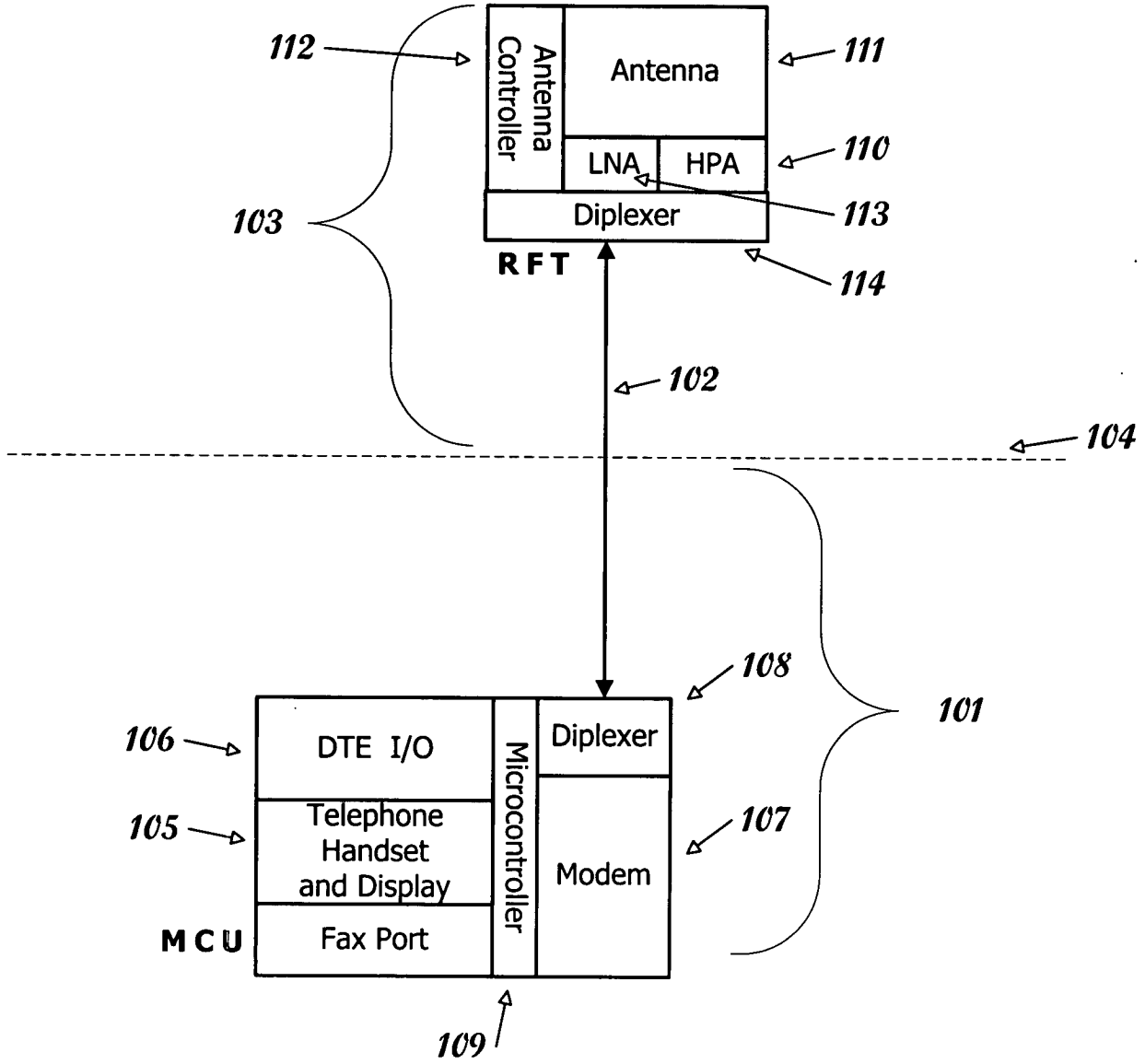


Fig. 1

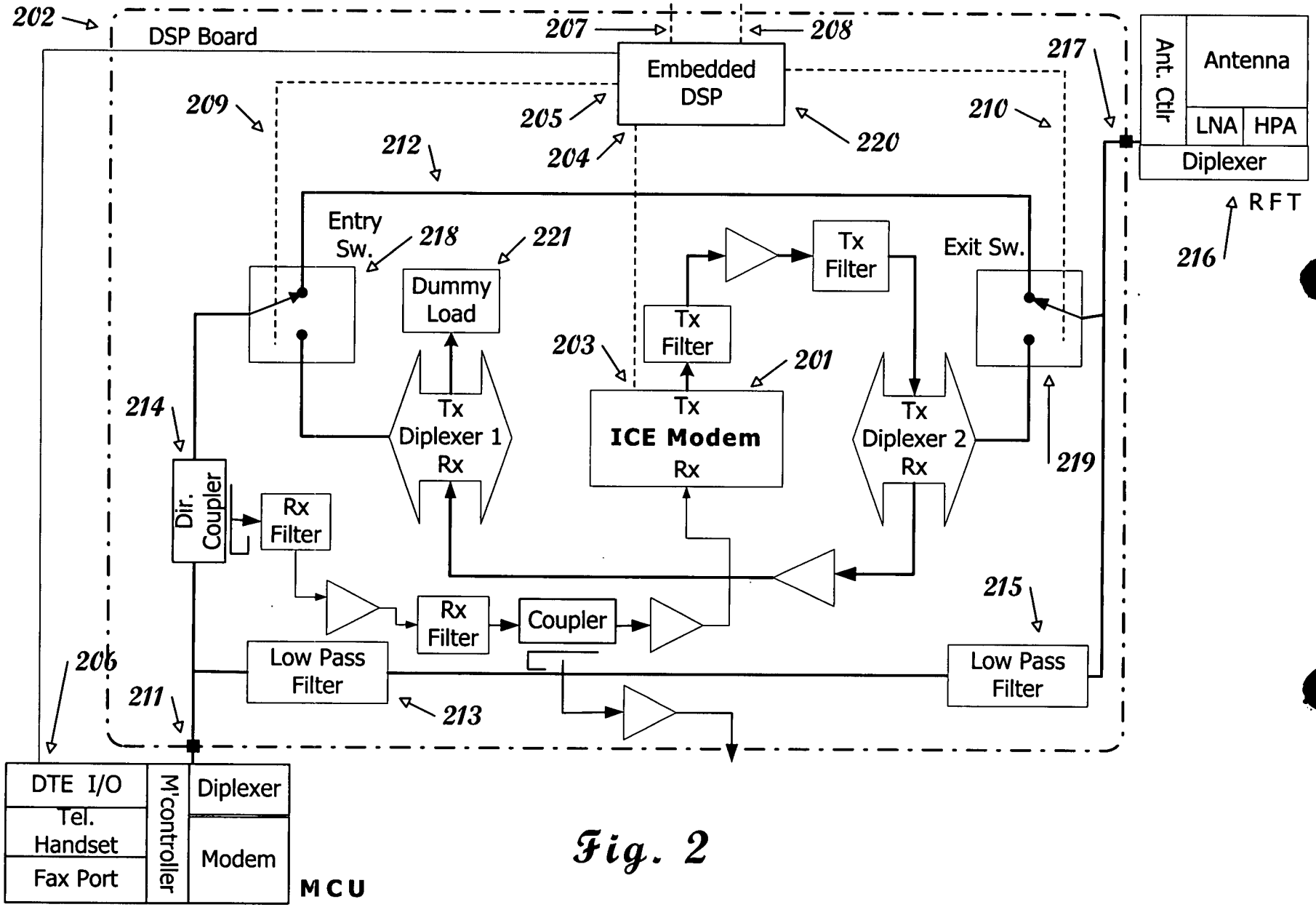

202
DSP Board
207
208
Embedded DSP
217
Ant. Ctlr
Antenna
LNA
HPA
Diplexer
RFT
216
209
205
204
220
210
212
Entry Sw.
218
221
Dummy Load
Tx Filter
Tx Filter
Exit Sw.
203
201
214
Tx Diplexer 1 Rx
Tx ICE Modem Rx
Tx Diplexer 2 Rx
219
Dir. Coupler
Rx Filter
Rx Filter
Coupler
215
Low Pass Filter
Low Pass Filter
206
211
213
DTE I/O
Tel. Handset
Fax Port
M'controller
Diplexer
Modem
MCU

Fig. 2

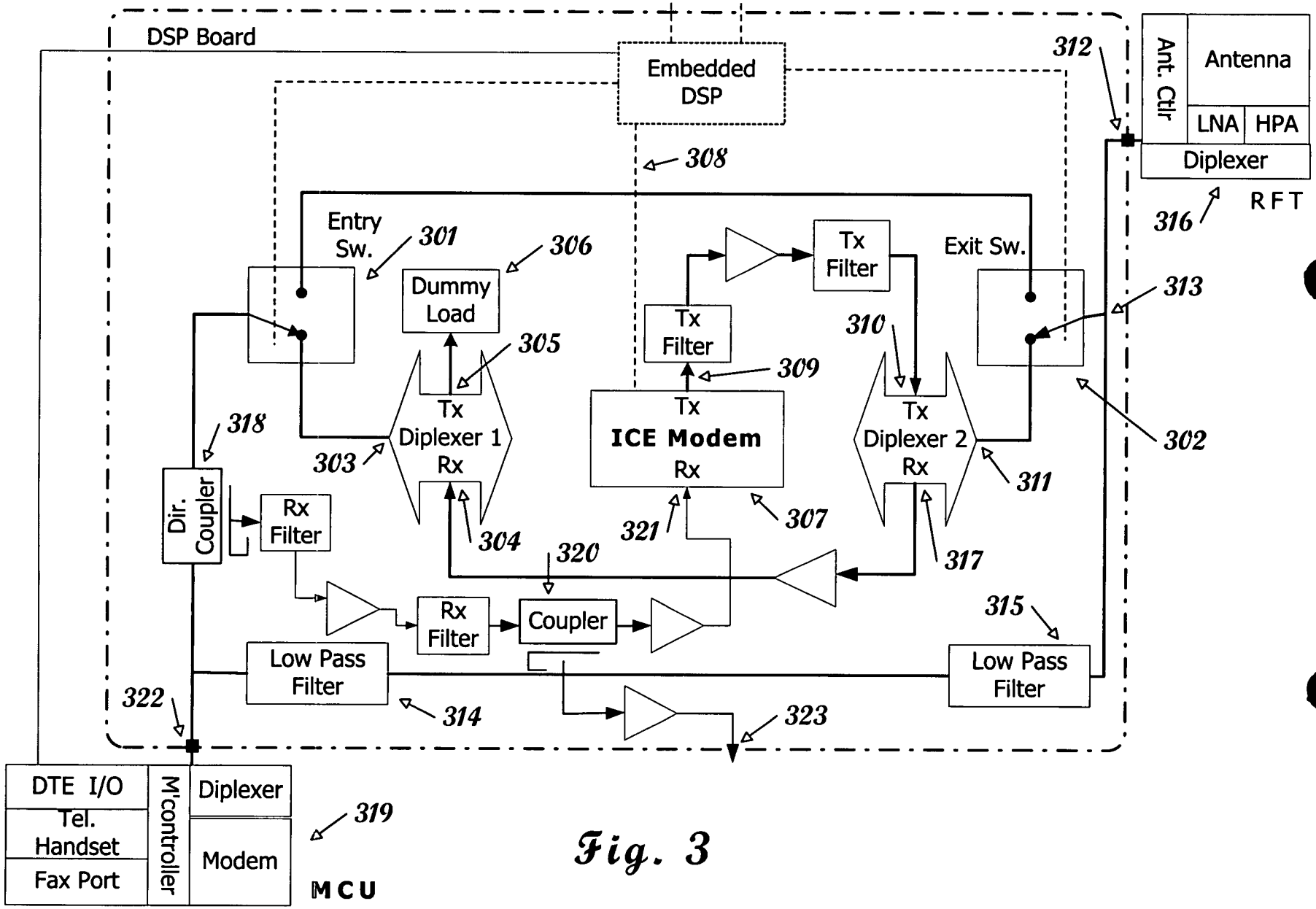

DSP Board
Embedded DSP
312
Ant. Ctlr
Antenna
LNA
HPA
Diplexer
RFT
316
308
Entry Sw.
301
306
Dummy Load
305
Tx Filter
Tx Filter
309
Exit Sw.
313
310
Tx Diplexer 1 Rx
Tx ICE Modem Rx
Tx Diplexer 2 Rx
303
318
302
Dir. Coupler
Rx Filter
304
320
321
307
311
317
Rx Filter
Coupler
315
Low Pass Filter
Low Pass Filter
322
314
323
DTE I/O
Tel. Handset
Fax Port
M'controller
Diplexer
Modem
319
MCU

Fig. 3

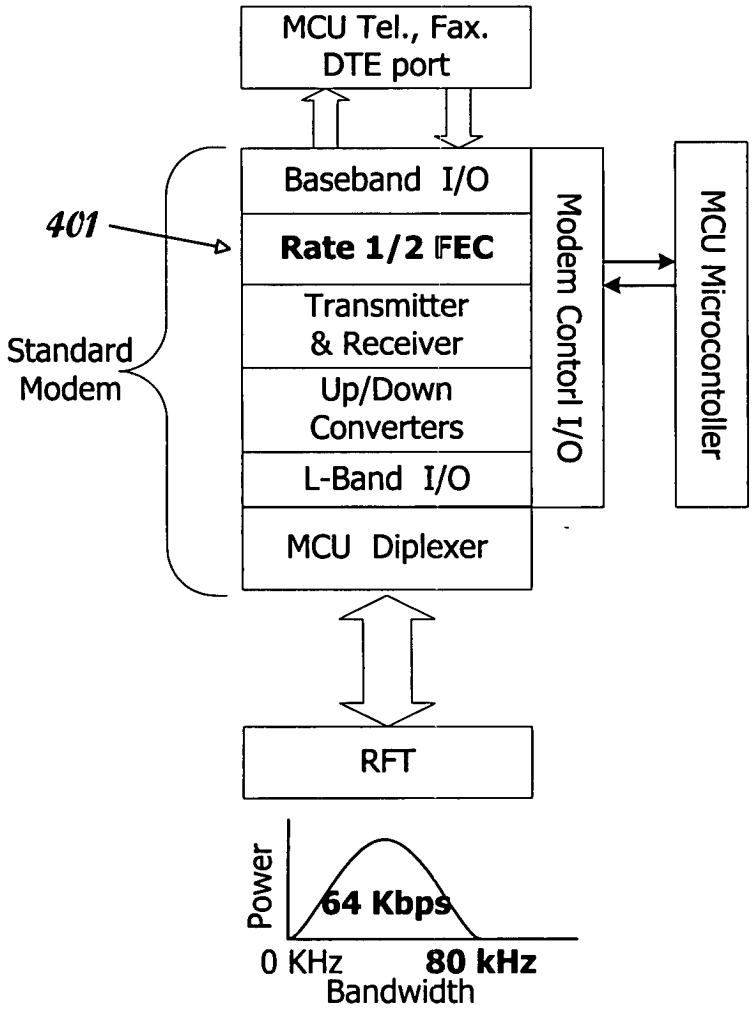

MCU Tel., Fax.
DTE port
401
Baseband I/O
Rate 1/2 FEC
Transmitter
& Receiver
Up/Down
Converters
L-Band I/O
MCU Diplexer
Standard
Modem
Modem Contorl I/O
MCU Microcontoller
RFT
Power
64 Kbps
0 KHz
80 kHz
Bandwidth

Fig. 4

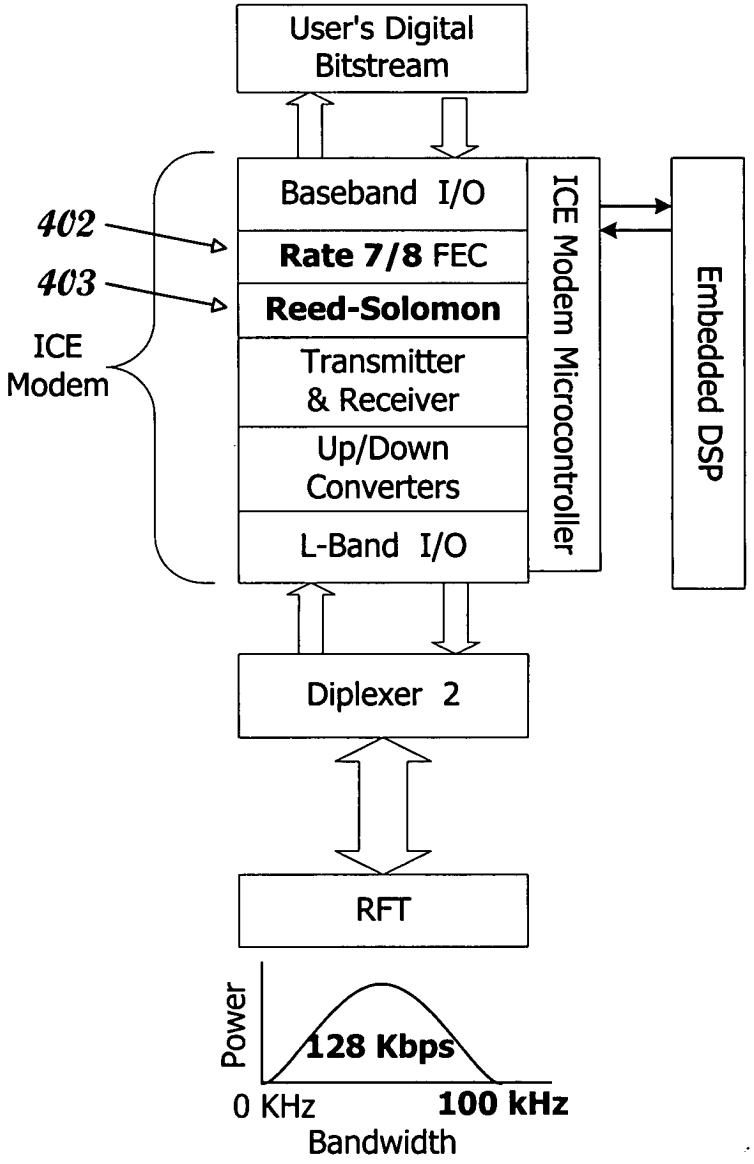
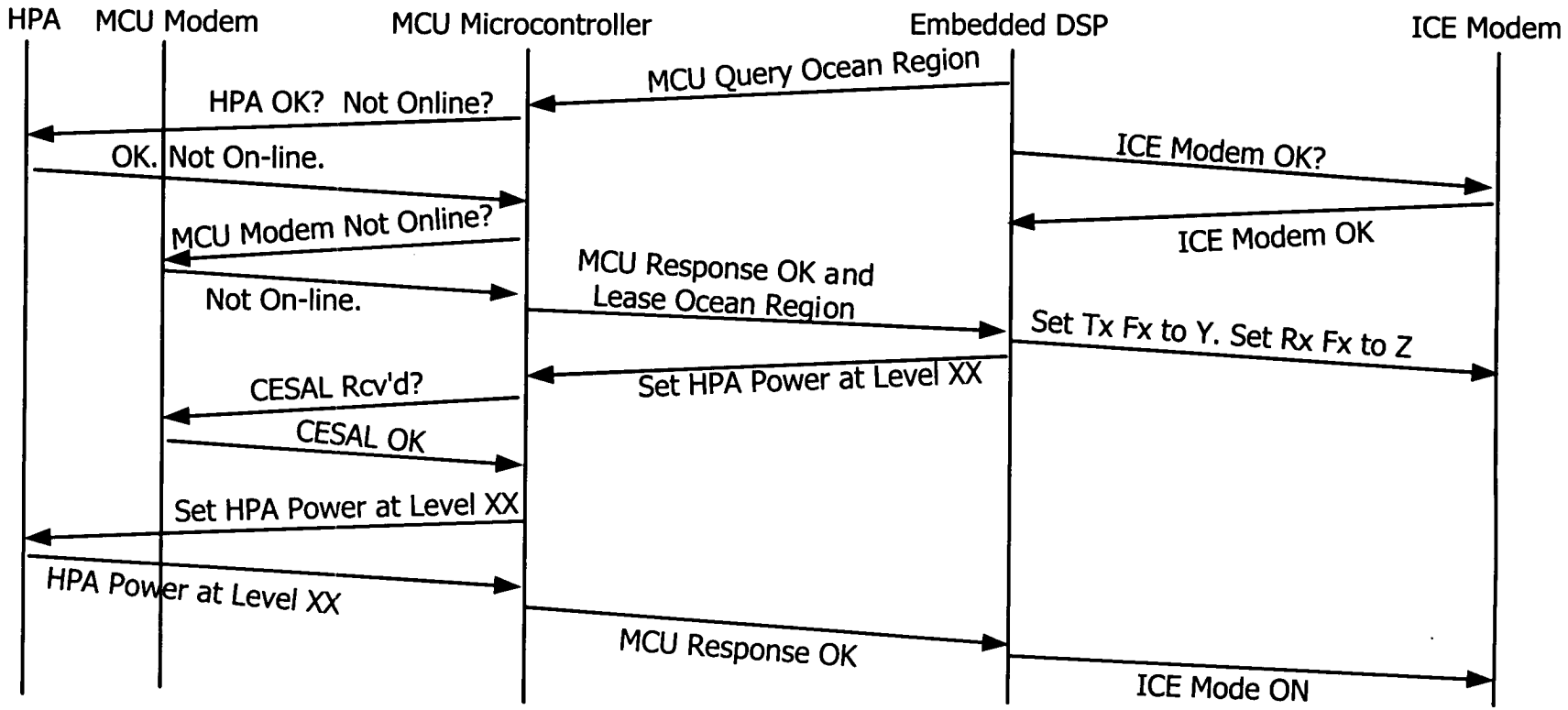

User's Digital
Bitstream
402
403
Baseband I/O
Rate 7/8 FEC
Reed-Solomon
Transmitter
& Receiver
Up/Down
Converters
L-Band I/O
ICE
Modem
ICE Modem Microcontroller
Embedded DSP
Diplexer 2
RFT
Power
128 Kbps
0 KHz
100 kHz
Bandwidth

Fig. 5

	MCU Status "OK"	Any MCU Status other than "OK", e.g., "Busy" (MCU modem on-line), or "Error" (MCU hardware or software error'.
HPA availability	HPA available for use by ICE Modem	HPA not available for use by ICE Modem
Permitted ICE Status	ICE Mode On or Off, as controlled by Embedded DSP and local user input	ICE Mode Off only, as controlled by Embedded DSP

Fig. 6

Fig. 7



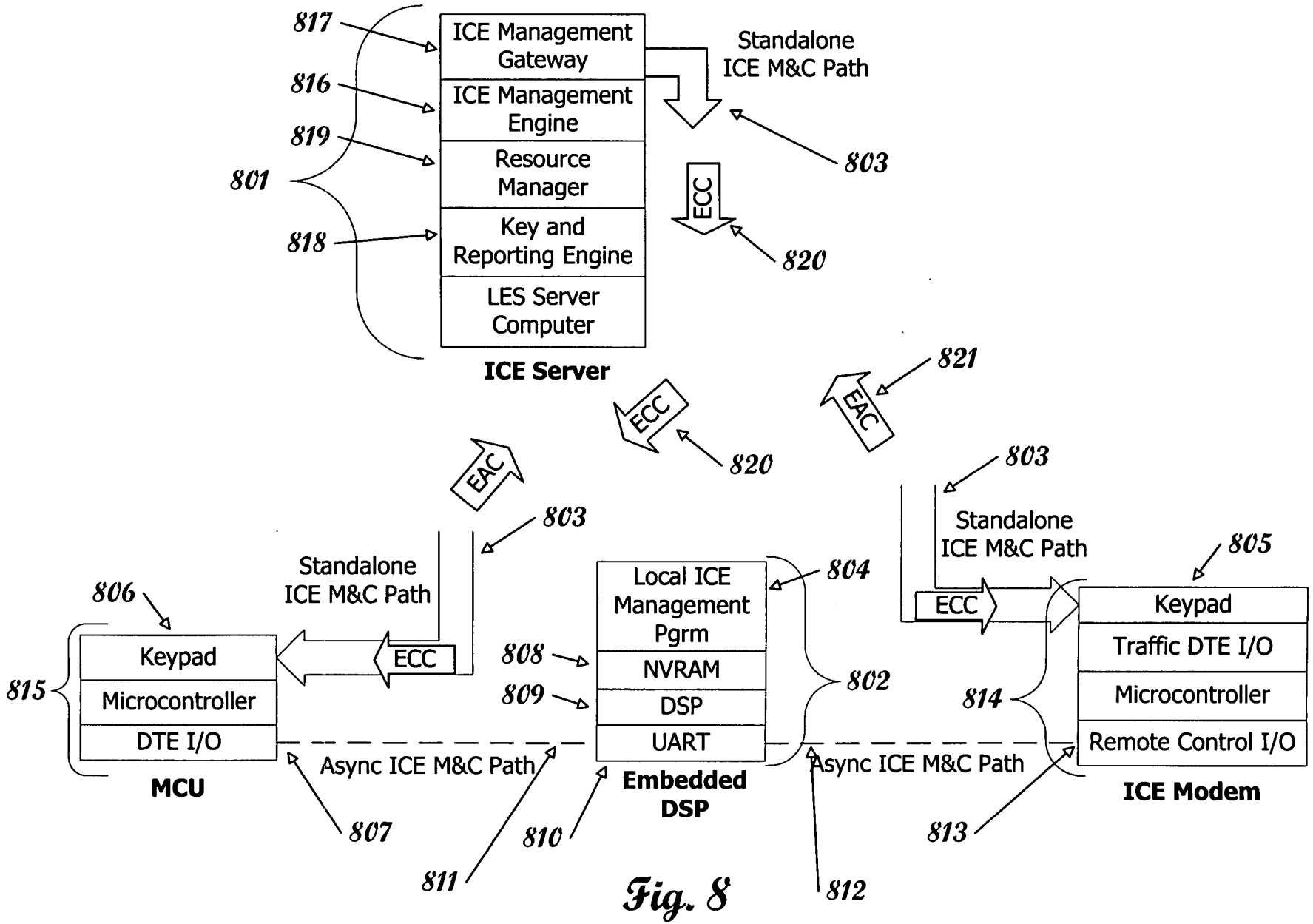

817
816
819
801
818
ICE Management Gateway
ICE Management Engine
Resource Manager
Key and Reporting Engine
LES Server Computer
ICE Server
Standalone ICE M&C Path
803
ECC
820
821
EAC
ECC
820
EAC
803
803
Standalone ICE M&C Path
Standalone ICE M&C Path
806
Keypad
Microcontroller
DTE I/O
815
ECC
808
809
Local ICE Management Pgrm
NVRAM
DSP
UART
804
802
ECC
805
Keypad
Traffic DTE I/O
Microcontroller
Remote Control I/O
814
Async ICE M&C Path
Async ICE M&C Path
MCU
Embedded DSP
ICE Modem
807
811
810
812
813

Fig. 8

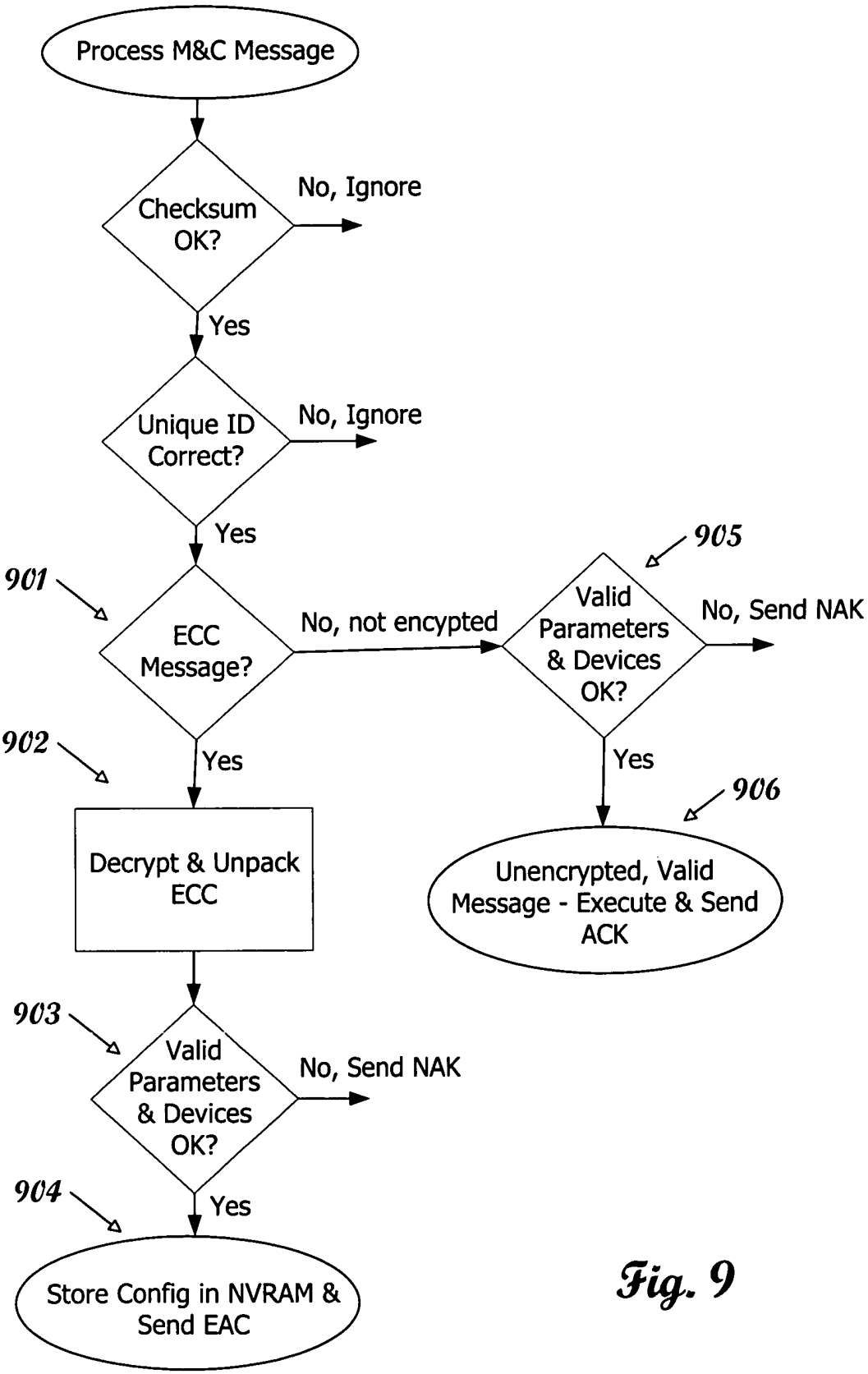

Process M&C Message
Checksum OK?
No, Ignore
Yes
Unique ID Correct?
No, Ignore
Yes
901
ECC Message?
No, not encypted
905
Valid Parameters & Devices OK?
No, Send NAK
Yes
902
Yes
906
Decrypt & Unpack ECC
Unencrypted, Valid Message - Execute & Send ACK
903
Valid Parameters & Devices OK?
No, Send NAK
904
Yes
Store Config in NVRAM & Send EAC

Fig. 9

T0h060" 08558860

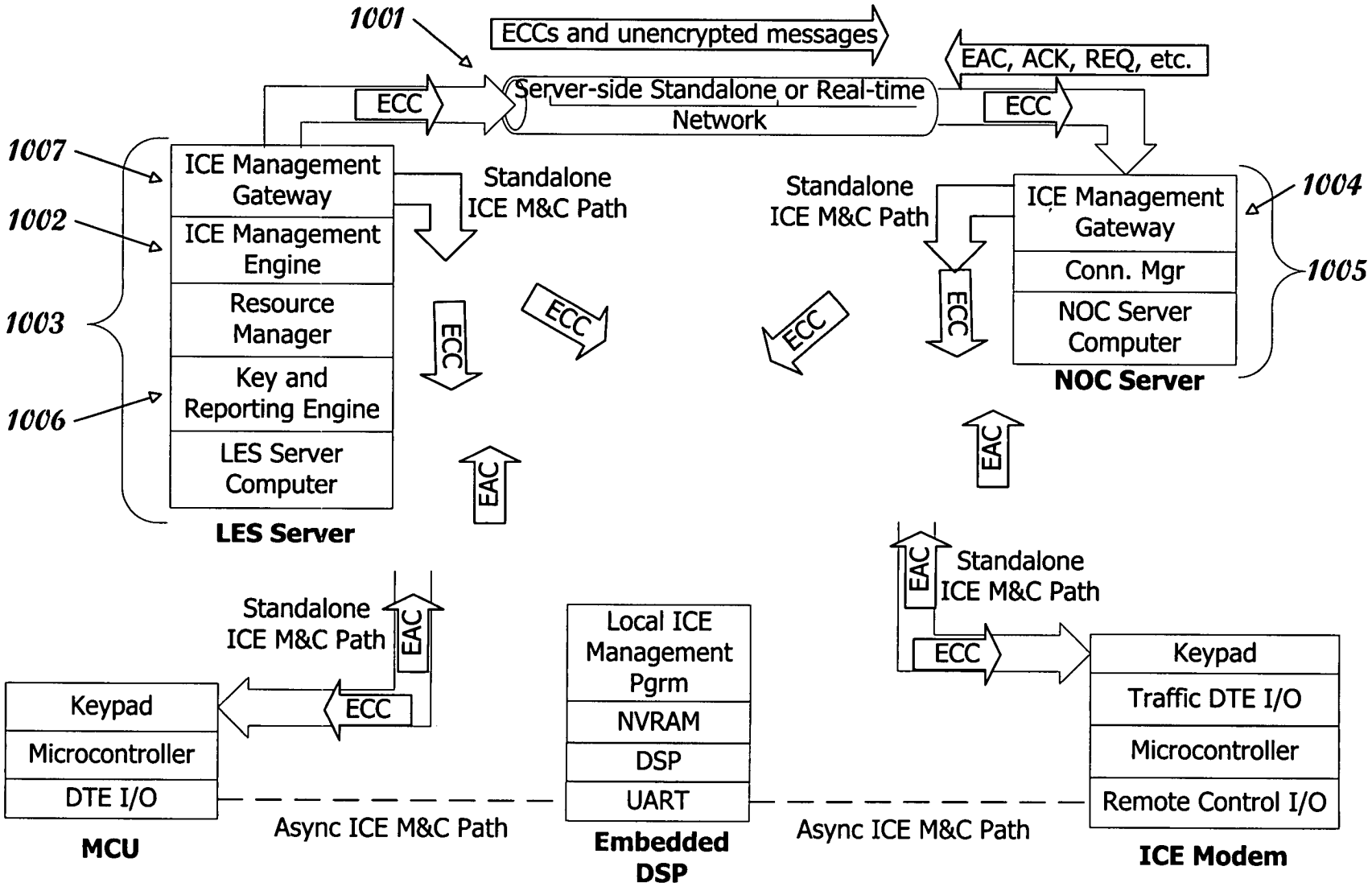


Fig. 10

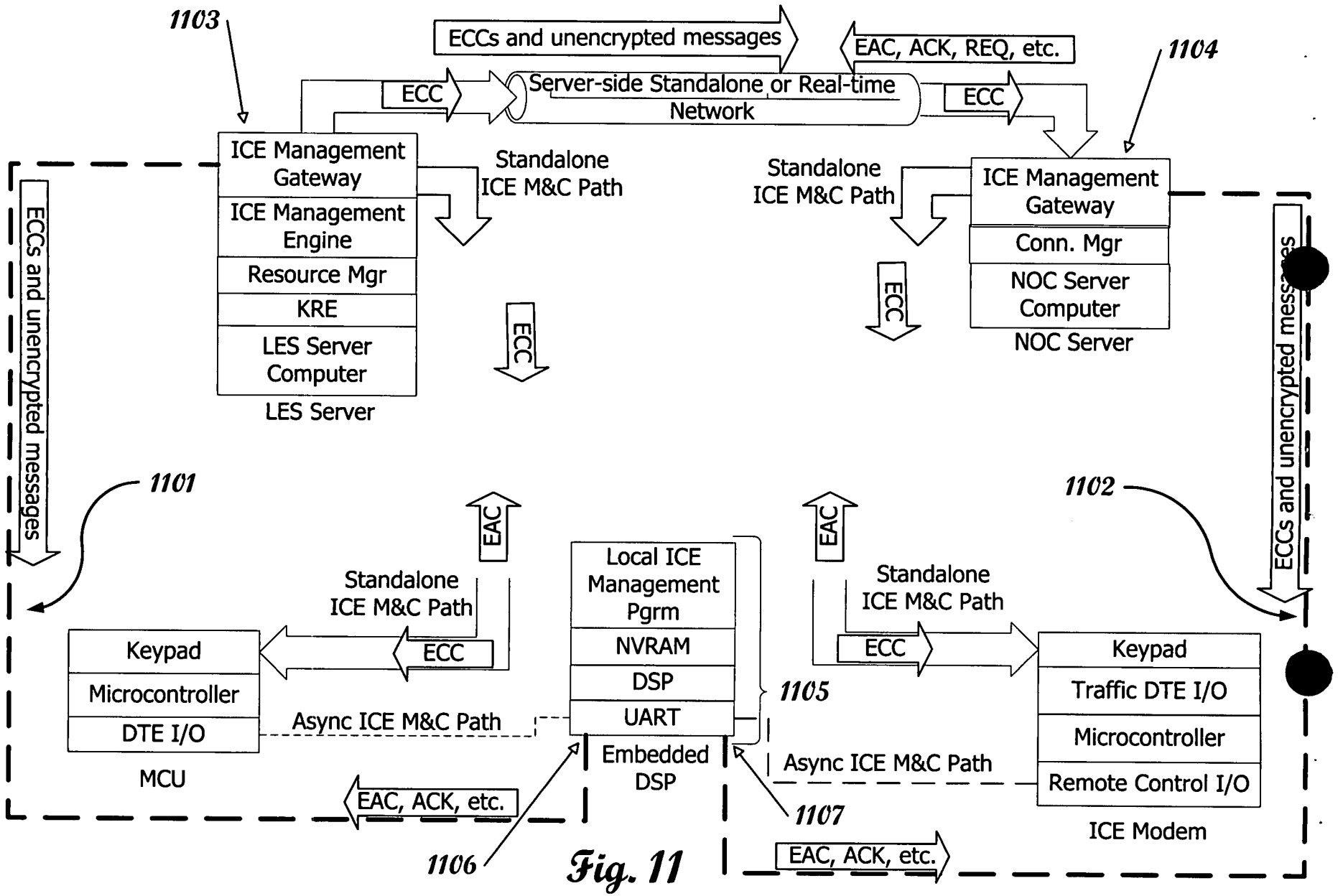

1103
ECCs and unencrypted messages
EAC, ACK, REQ, etc.
1104
ECC
Server-side Standalone or Real-time Network
ECC
ICE Management Gateway
ICE Management Engine
Resource Mgr
KRE
LES Server Computer
LES Server
Standalone ICE M&C Path
Standalone ICE M&C Path
ICE Management Gateway
Conn. Mgr
NOC Server Computer
NOC Server
ECC
ECC
ECCs and unencrypted messages
ECCs and unencrypted messages
1101
1102
EAC
EAC
Standalone ICE M&C Path
Standalone ICE M&C Path
ECC
ECC
Keypad
Microcontroller
DTE I/O
MCU
Async ICE M&C Path
Local ICE Management Pgrm
NVRAM
DSP
UART
Embedded DSP
1105
Async ICE M&C Path
Keypad
Traffic DTE I/O
Microcontroller
Remote Control I/O
ICE Modem
EAC, ACK, etc.
1107
1106
EAC, ACK, etc.

Fig. 11

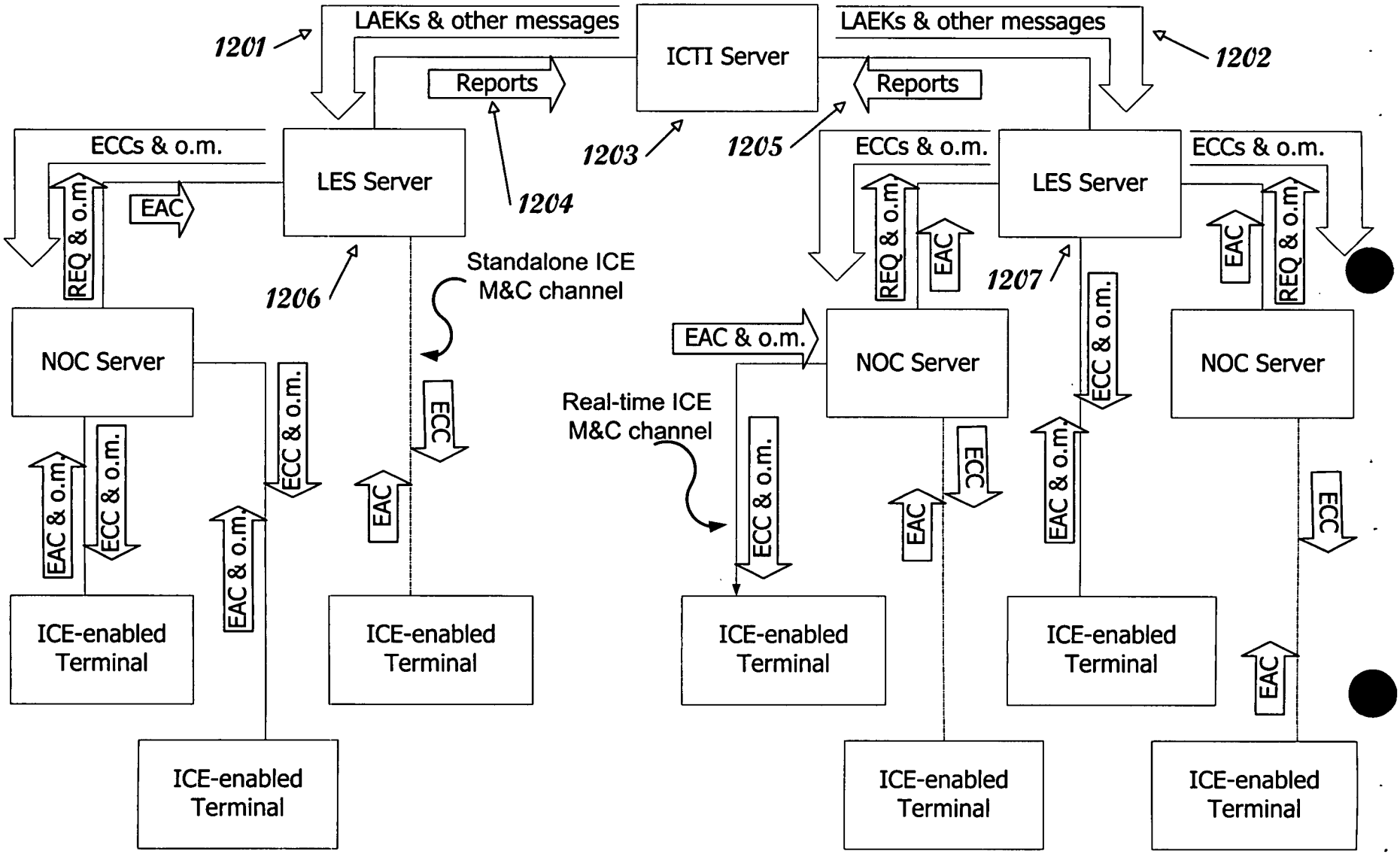

1201
LAEKs & other messages
ICTI Server
LAEKs & other messages
1202
Reports
Reports
ECCs & o.m.
LES Server
1203
1205
ECCs & o.m.
LES Server
ECCs & o.m.
EAC
REQ & o.m.
1204
REQ & o.m.
EAC
EAC
REQ & o.m.
1206
Standalone ICE
M&C channel
1207
NOC Server
EAC & o.m.
NOC Server
NOC Server
ECC & o.m.
ECC & o.m.
ECC
Real-time ICE
M&C channel
EAC & o.m.
ECC & o.m.
EAC & o.m.
EAC & o.m.
EAC
ECC
ECC
EAC
ICE-enabled Terminal
ICE-enabled Terminal
ICE-enabled Terminal
ICE-enabled Terminal
ICE-enabled Terminal
ICE-enabled Terminal
EAC
ICE-enabled Terminal
ICE-enabled Terminal

Fig. 12

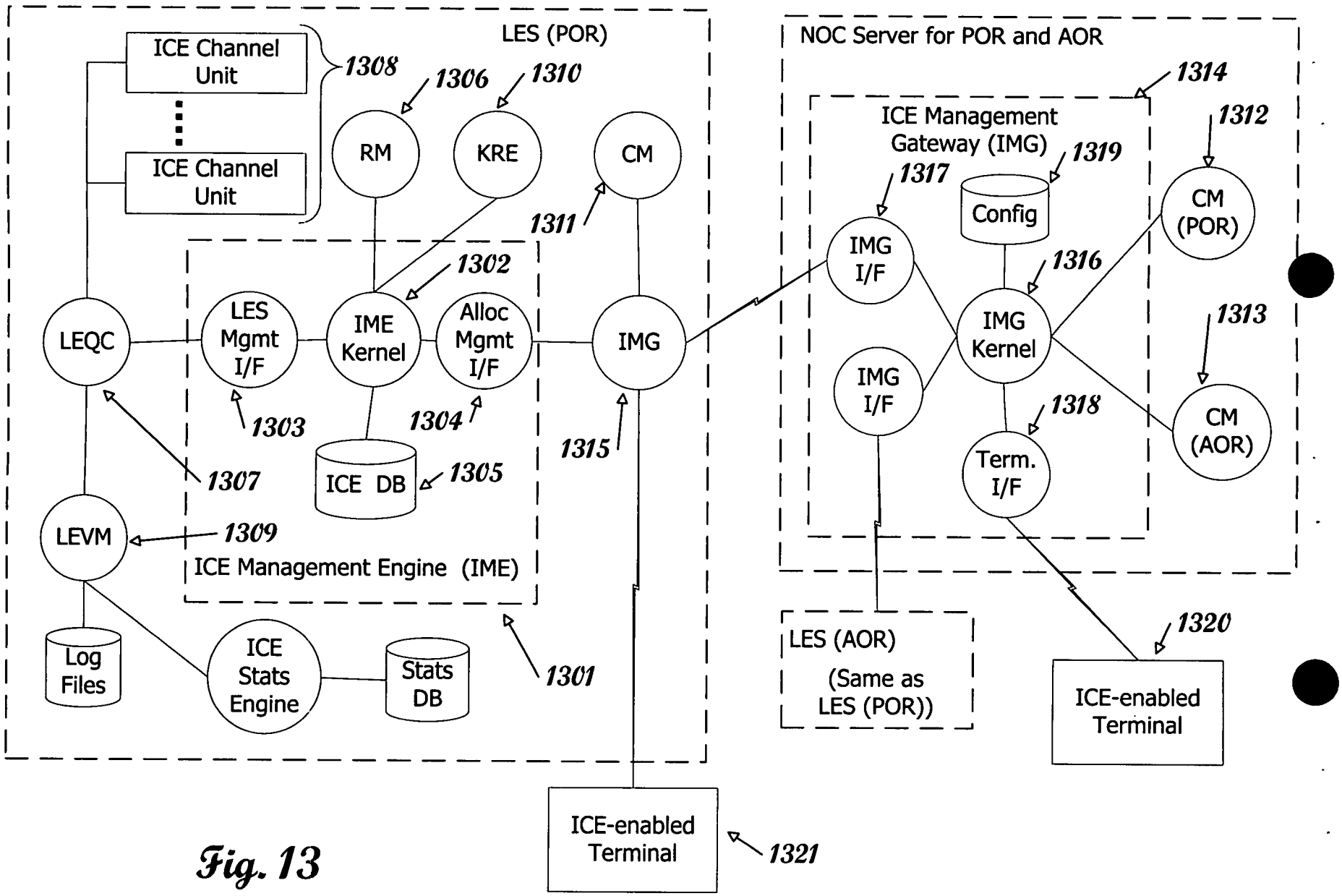

LES (POR)
ICE Channel Unit
ICE Channel Unit
1308
1306
1310
RM
KRE
CM
1311
1302
LEQC
LES Mgmt I/F
IME Kernel
Alloc Mgmt I/F
IMG
1303
1304
1315
ICE DB
1305
1307
LEVM
1309
ICE Management Engine (IME)
Log Files
ICE Stats Engine
Stats DB
1301
NOC Server for POR and AOR
1314
ICE Management Gateway (IMG)
1319
1317
Config
1312
CM (POR)
IMG I/F
1316
IMG Kernel
1313
IMG I/F
1318
CM (AOR)
Term. I/F
1320
LES (AOR)
(Same as LES (POR))
ICE-enabled Terminal
ICE-enabled Terminal
1321

Fig. 13

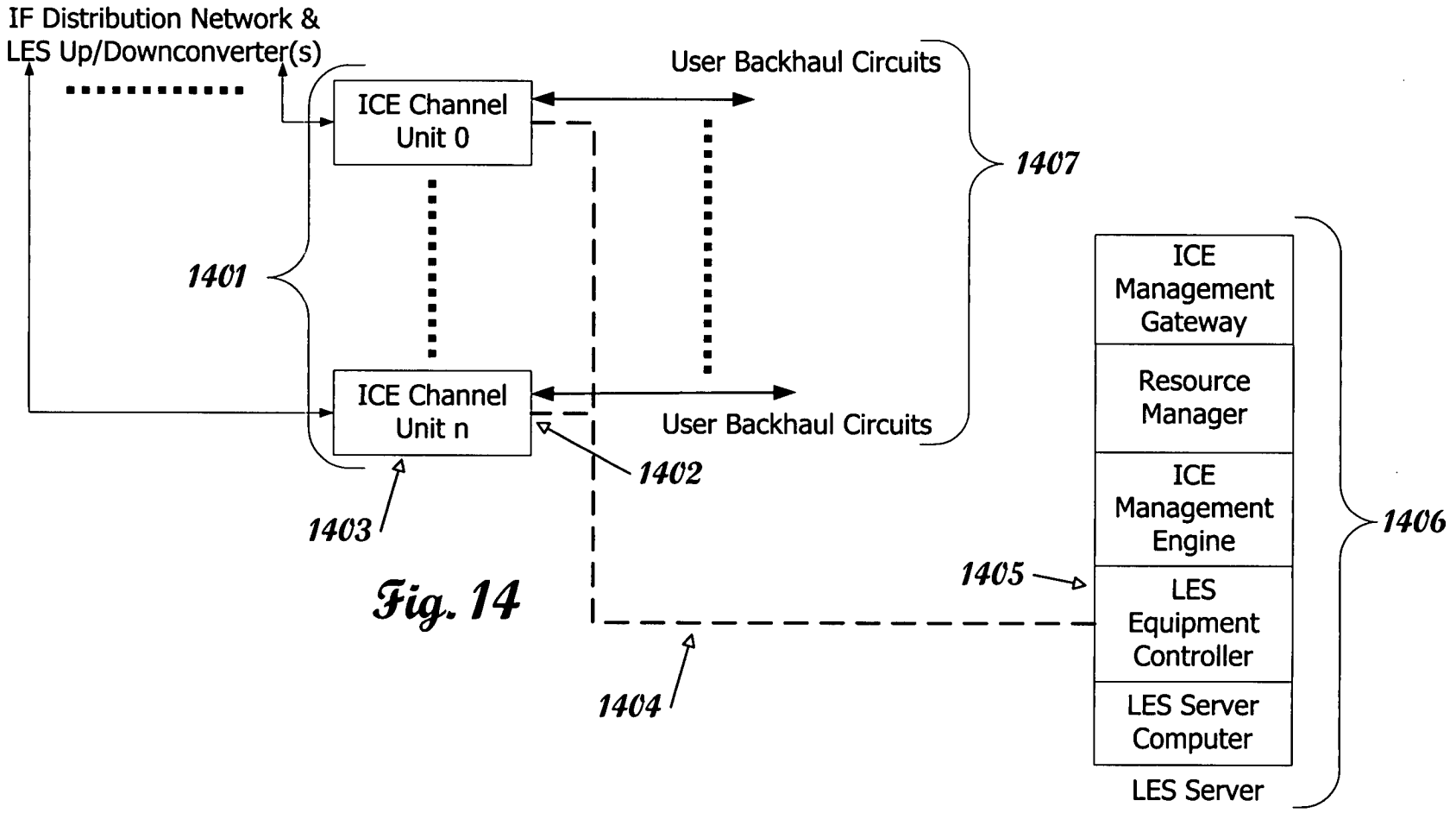

IF Distribution Network &
LES Up/Downconverter(s)
ICE Channel
Unit 0
ICE Channel
Unit n
User Backhaul Circuits
User Backhaul Circuits
1401
1402
1403
1404
1405
1406
1407
ICE
Management
Gateway
Resource
Manager
ICE
Management
Engine
LES
Equipment
Controller
LES Server
Computer
LES Server

Fig. 14

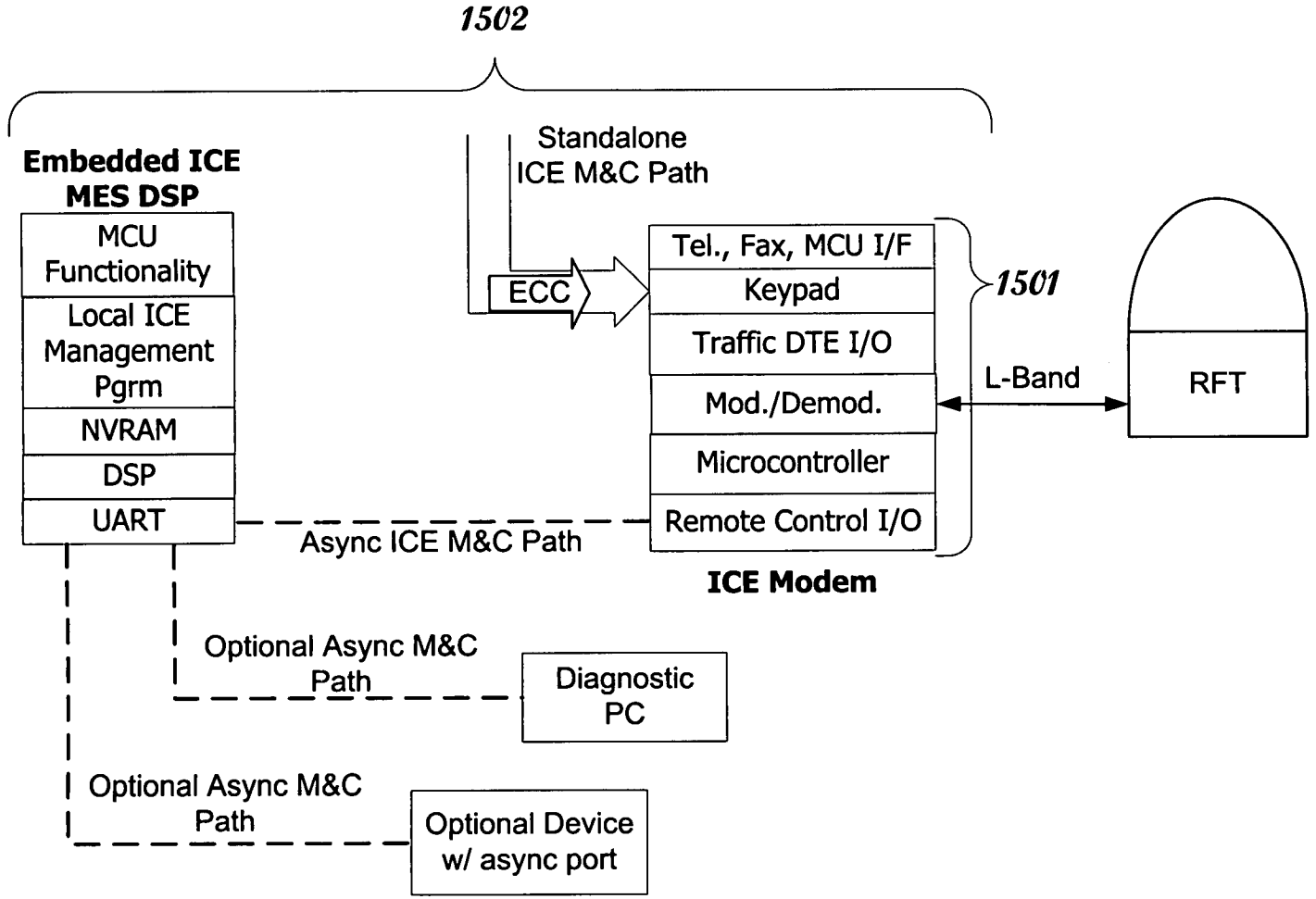

1502
Embedded ICE
MES DSP
MCU Functionality
Local ICE Management Pgrm
NVRAM
DSP
UART
Standalone ICE M&C Path
ECC
Tel., Fax, MCU I/F
Keypad
Traffic DTE I/O
Mod./Demod.
Microcontroller
Remote Control I/O
1501
L-Band
RFT
Async ICE M&C Path
ICE Modem
Optional Async M&C Path
Diagnostic PC
Optional Async M&C Path
Optional Device w/ async port

Fig. 15

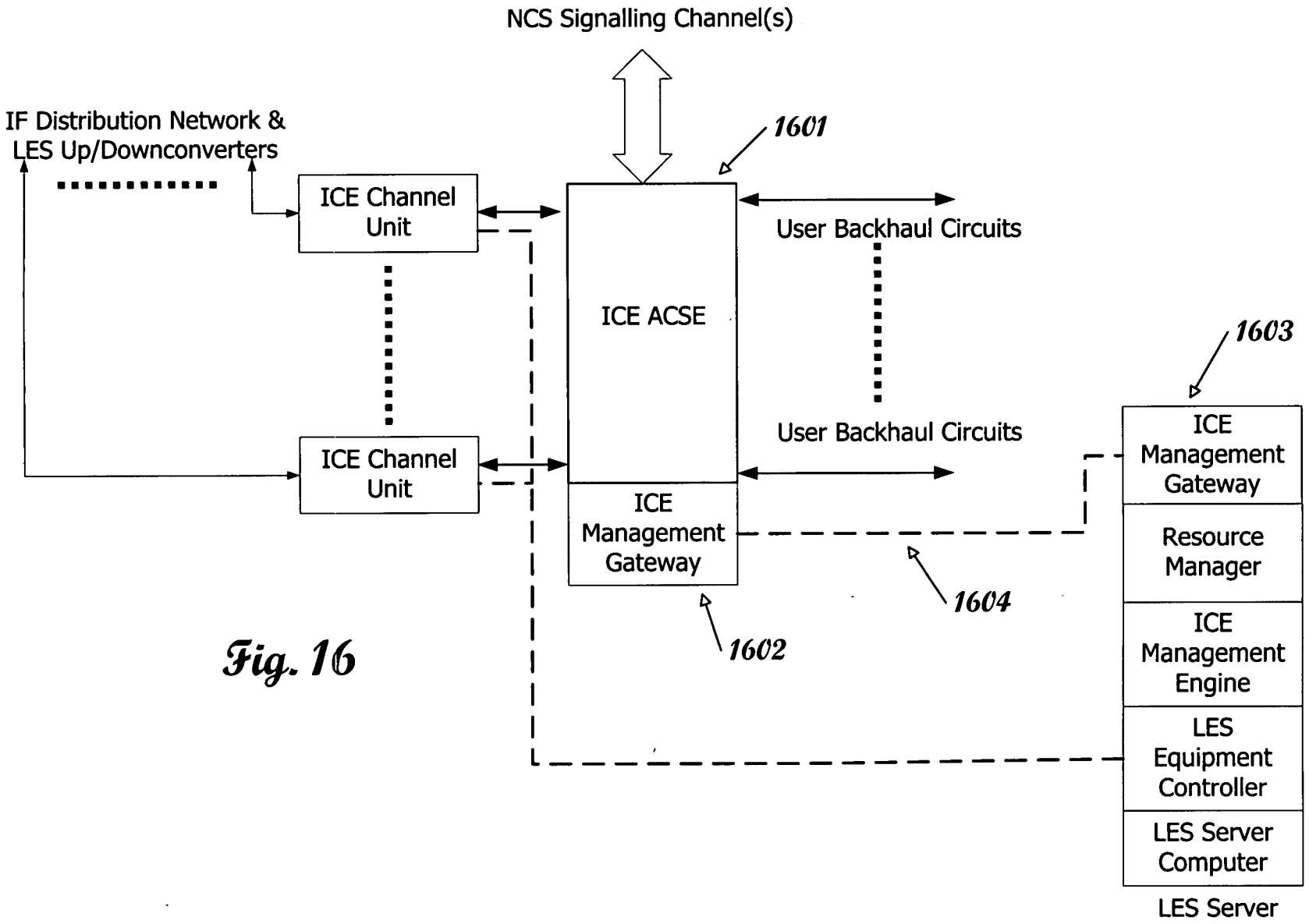

NCS Signalling Channel(s)
IF Distribution Network &
LES Up/Downconverters
ICE Channel
Unit
ICE Channel
Unit
1601
ICE ACSE
User Backhaul Circuits
User Backhaul Circuits
ICE
Management
Gateway
1602
1603
ICE
Management
Gateway
Resource
Manager
1604
ICE
Management
Engine
LES
Equipment
Controller
LES Server
Computer
LES Server

Fig. 16

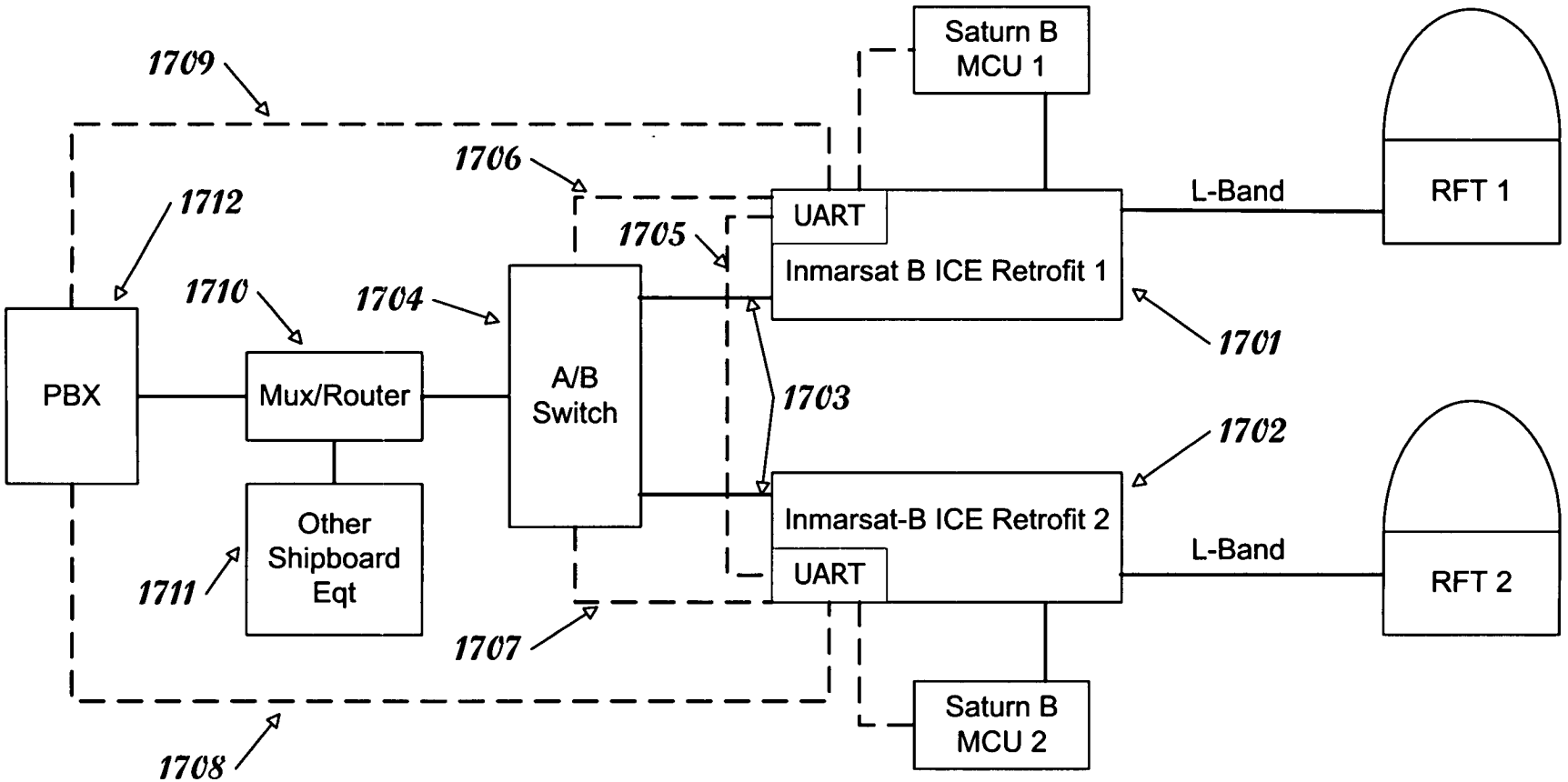

1709
1706
1712
1705
1710
1704
1703
1701
1702
1711
1707
1708
PBX
Mux/Router
A/B Switch
Other Shipboard Eqt
Saturn B MCU 1
UART
Inmarsat B ICE Retrofit 1
L-Band
RFT 1
Inmarsat-B ICE Retrofit 2
UART
L-Band
RFT 2
Saturn B MCU 2

Fig. 17

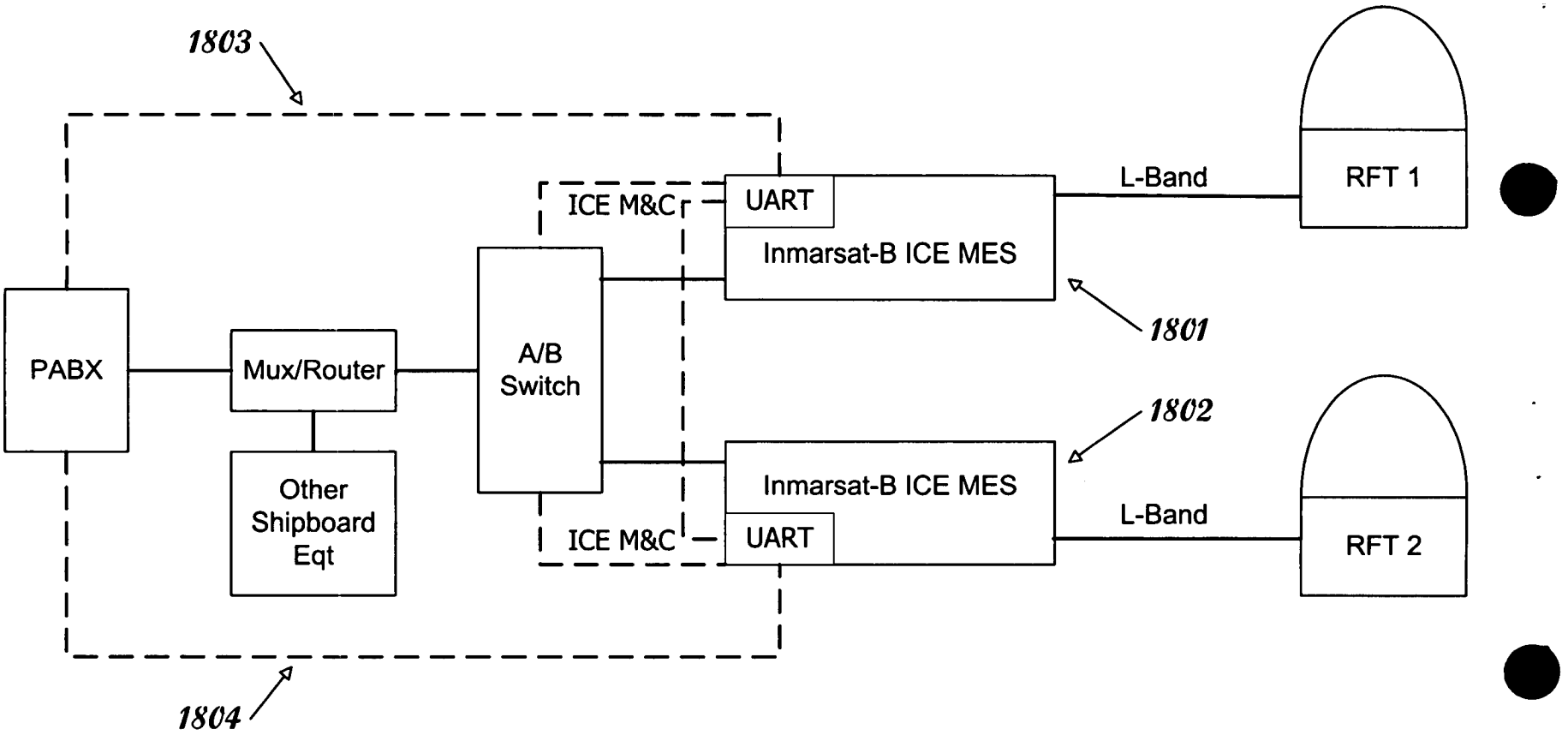

1803
ICE M&C
UART
Inmarsat-B ICE MES
L-Band
RFT 1
1801
PABX
Mux/Router
A/B
Switch
1802
Other
Shipboard
Eqt
Inmarsat-B ICE MES
L-Band
RFT 2
ICE M&C
UART
1804

Fig. 18

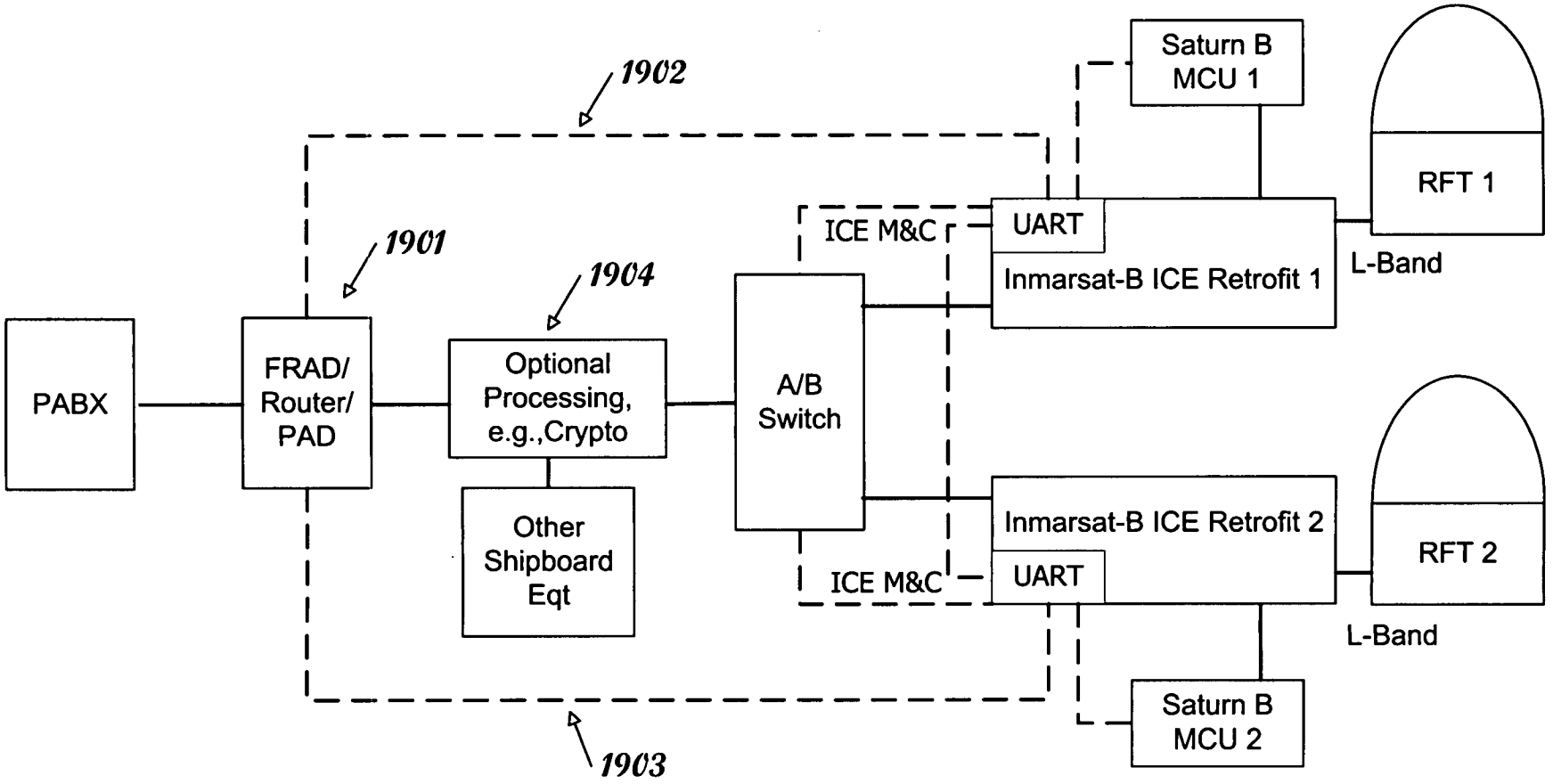

1902
1901
1904
1903
PABX
FRAD/
Router/
PAD
Optional
Processing,
e.g.,Crypto
Other
Shipboard
Eqt
A/B
Switch
ICE M&C
UART
Inmarsat-B ICE Retrofit 1
Saturn B
MCU 1
RFT 1
L-Band
Inmarsat-B ICE Retrofit 2
UART
ICE M&C
Saturn B
MCU 2
RFT 2
L-Band

Fig. 19

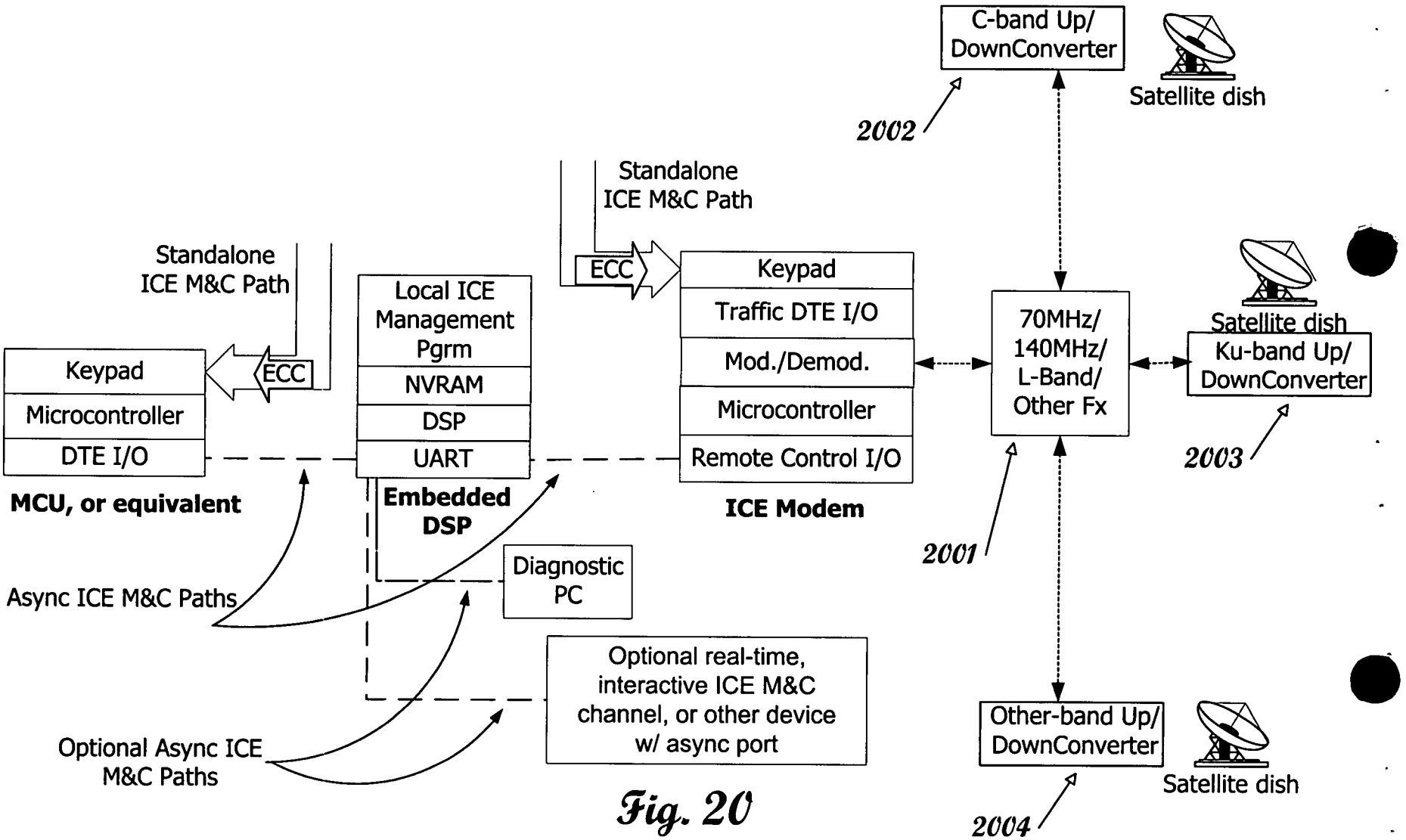

C-band Up/
DownConverter
Satellite dish
2002
Standalone
ICE M&C Path
ECC
Keypad
Traffic DTE I/O
Mod./Demod.
Microcontroller
Remote Control I/O
ICE Modem
70MHz/
140MHz/
L-Band/
Other Fx
Satellite dish
Ku-band Up/
DownConverter
2003
2001
Standalone
ICE M&C Path
Keypad
Microcontroller
DTE I/O
ECC
MCU, or equivalent
Local ICE
Management
Pgrm
NVRAM
DSP
UART
Embedded
DSP
Diagnostic
PC
Async ICE M&C Paths
Optional real-time,
interactive ICE M&C
channel, or other device
w/ async port
Optional Async ICE
M&C Paths
Other-band Up/
DownConverter
Satellite dish
2004

Fig. 20

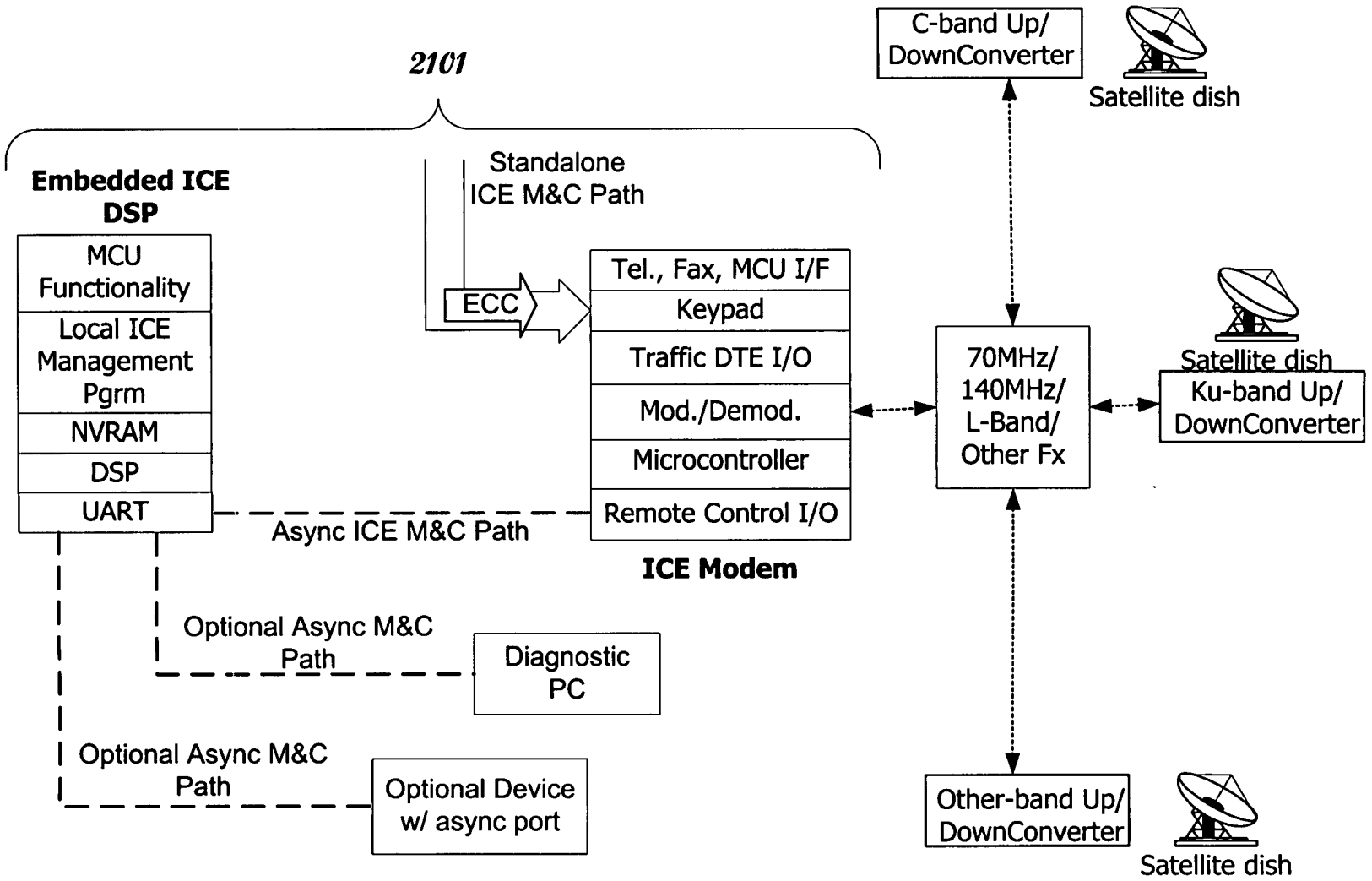

2101
Embedded ICE DSP
MCU Functionality
Local ICE Management Pgrm
NVRAM
DSP
UART
Standalone ICE M&C Path
ECC
Tel., Fax, MCU I/F
Keypad
Traffic DTE I/O
Mod./Demod.
Microcontroller
Remote Control I/O
ICE Modem
Async ICE M&C Path
Optional Async M&C Path
Diagnostic PC
Optional Async M&C Path
Optional Device w/ async port
C-band Up/ DownConverter
Satellite dish
70MHz/ 140MHz/ L-Band/ Other Fx
Satellite dish
Ku-band Up/ DownConverter
Other-band Up/ DownConverter
Satellite dish

Fig. 21